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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. |
|-----------------|-------------|----------------------|---------------------|
| 09/172,389 | 10/14/98 | LARSON | 10581013.1 |

LMC1/0822
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EXAMINER

NGUYEN, K

ART UNIT PAPER NUMBER

2772

DATE MAILED: 08/22/00

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

| | | | |
|------------------------------|-------------------------------|-----------------------------------|--|
| Office Action Summary | Application No. 09/172,389 | Applicant(s) LARSON, RONALD D. | |
| | Examiner Kimbinh T. Nguyen | Art Unit 2772 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

- 1) ☒ Responsive to communication(s) filed on 14 October 1998.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some * c) ☐ None of the CERTIFIED copies of the priority documents have been:
1. ☐ received.
2. ☐ received in Application No. (Series Code / Serial Number) _____.
3. ☐ received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

- | | |
|---|--|
| 15) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 18) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 16) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 19) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 17) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>2</u> . | 20) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-7, 9-20 are rejected under 35 U.S.C. 102(b) as being participated by Greene et al. (5,579,455).

Claims 1, 11 and 18, Greene et al. discloses creating a Z pyramid data structure (col. 5, lines 51-52), the z pyramid data structure comprising at least first and second levels, each level comprising a plurality of regions (col. 5, lines 51-65), each region comprising subregions (col. 26, lines 38-39), each subregion corresponding to a single Z value (col. 26, lines 39-45), each region corresponding to a plurality of Z values of the region, wherein each subregion in the second level has a Z value that corresponds to a maximum Z value of a subregions in the first level (col. 26, lines 47-51), the logic comparing the minimum Z value of each primitive with the Z value of a region associated with the tested primitive to determine whether or not the tested primitive is fully occluded (col. 26, lines 61-67).

Claims 2, 12 and 19, Greene et al. discloses if the tested primitive is not fully occluded, the logic determine whether or not any subregion of the region associated with the tested primitive is

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fully covered by the primitive, wherein if a subregion is fully covered by the tested primitive, then the logic determines whether or not the Z value of the covered subregion needs to be replaced with the maximum Z value of the tested primitive (col. 19, lines 44-49, fig. 12).

Claims 3, 13 and 20, Greene et al. discloses the logic to determine whether the Z value of the covered subregion needs to be replaced with the maximum Z value of the tested primitive, the logic determines whether the maximum Z value of the tested primitive is less than the Z value (nearer than the current depth value) for the covered subregion, if the maximum Z value is less than the Z value for the covered subregion, then the Z value for the covered subregion is replaced with the maximum Z value (col. 19, lines 50-53).

Claims 4 and 14, Greene et al. discloses the logic maintains a coverage mask for each level Z pyramid data structure, each coverage mask comprising a bit for each subregion of the level Z pyramid data associated with the coverage mask, wherein the logic determines that the maximum Z value of the primitive is less than the value (nearer than the nearest depth) for the covered subregion, a bit in the coverage mask associated with the covered subregion is set (col. 17, lines 26-32).

Claims 5 and 15, Greene et al. discloses all coverage mask bits corresponding to the subregions of a particular region have been set in the coverage mask associated with the first level of the Z pyramid data, a bit is set for the corresponding region in the coverage mask associated with the second level in the Z pyramid data (col. 18, lines 9-19)

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Claims 6 and 16, Greene et al. discloses the bits in the coverage mask have been set for a particular region in the coverage mask, the logic replaces the maximum Z value for the particular region with the maximum Z value of the subregions associated with the particular region (fig. 19A).

Claims 7 and 17, Greene et al. discloses the logic sets the corresponding bit in the coverage mask for a next level up in the Z pyramid (col. 10, lines 8-67).

Claim 9, Green et al. discloses the tiler being in communication with a Z pyramid memory element, the Z pyramid memory storing the Z pyramid data (col. 28, lines 1-24).

Claim 10, Greene et al. discloses the Z pyramid memory is periodically updated with the pixel Z values corresponding to Z values of primitives which have been scan converted into screen coordinates, wherein the pixel level Z are used by the tiler (quadrant) to periodically reconstruct the Z pyramid data (col. 5, line 60 through col. 6, line 36).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Greene et al. (5,579,455) in view of Greene et al. (5,600,763).

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Claim 8, Greene et al. (5,600,763) discloses the primitive are occlusion tested in a tiler component of the graphics wherein the Z pyramid data is updated by the tiler on the fly as primitives are being processed through the graphics system (col. 6, lines 29-40). It would have been obvious to one ordinary skill in the art to include a “tiling pass” as taught by Greene, because tiling pass (very rapidly) has culled most of the hidden polygons and inserted the remaining polygons into the quadtree (Z pyramid).

5. Any response to this action should be mailed to

Commissioner of Patents and Trademarks Office

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Or faxed to:

(703) 308-9051, (for formal communications intended for entry)

Or:

(703) 308-6606 (for informal or draft communications, please label
“PROPOSED” or “DRAFT”)

Hand- delivered responses should be brought to Crystal Park II, 2021 Crystal Drive,
Arlington. VA., Sixth Floor (Receptionist).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kimbinh Nguyen whose telephone number is (703) 305-9683. The examiner can normally be reached on Monday through Friday From 7:30 a.m. to 5:00p.m. (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor,

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Mark Zimmerman, can be reach on (703)305-9798. However, in such a case, please allow at least one business day before contacting Mark Zimmerman.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the group receptionist whose telephone number is (703)305-3900.

Kimbinh Nguyen

August 18, 2000



MARK ZIMMERMAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2700